PENTAIR

Raychem NGC-30 Demo Unit

USER MANUAL

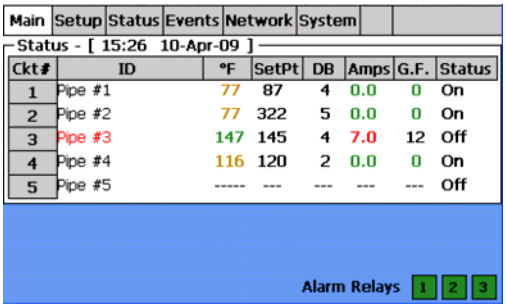

Main
Setup
Status
Events
Network
System
Status - [15:26 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 Pipe #1 77 87 4 0.0 0 On
2 Pipe #2 77 322 5 0.0 0 On
3 Pipe #3 147 145 4 7.0 12 Off
4 Pipe #4 116 120 2 0.0 0 On
5 Pipe #5 ----- --- --- --- --- Off
Alarm Relays 1 2 3

Table of Contents

Section – 1 Connection Diagram – Standard Setup 3

Section – 2 Information Charts 4

2.1 RTD Switch Settings 4

2.2 Color Coding of Main Screen 4

2.3 NGC-30-CRM/-CRMS LED Functions 4

Section – 3 Main Screen and Events/Alarms Navigation 5

3.1 Navigating Between Screens 5

3.2 Navigation Buttons 5

3.3 Navigational Header 6

Section – 4 NGC-UIT Software Upgrade Process 7

Section – 5 Setting NGC-UIT Program to Demo Mode 9

Section – 6 Quick Start for Demo 11

6.1 Setup of Circuit 3 11

6.1.1 Circuit 3 Setup Complete Confirmation 24

6.1.2 Circuit 5 Voltage Monitoring – Status Only 25

6.2 Creating Alarms 25

6.2.1 Ground-Fault Trip Alarm 25

6.2.2 Low and High Temperature Alarms 27

6.2.3 Low and High Current Alarms 30

6.2.4 High Current Alarm 31

6.2.5 Ground-Fault Alarm 33

6.2.6 Communication Alarm 35

6.3 Proportional Control Demonstration 36

6.3.1 Circuit 1- Using the LED Light 36

Appendix A. PLI Demo Unit 37

PLI Demo Unit - Connection Diagram 38

PLI Box 39

Transformer 39

Power Line Carrier Interface Module (PLI) 39

PLI Demo Voltage Adjustment 40

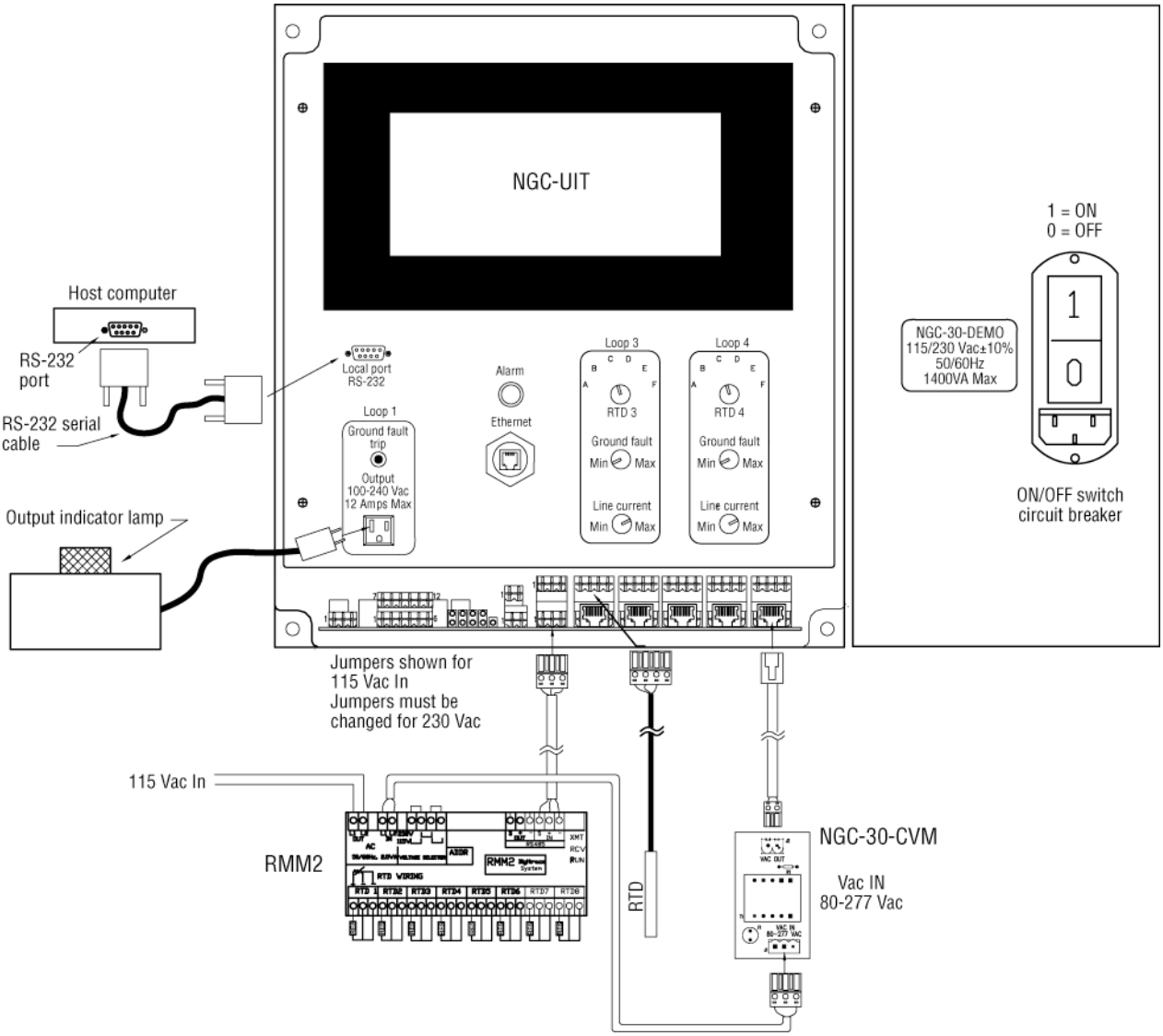
Pipe Sculpture 42

SES Transmitter 43

SPC Transmitter 43

Section – 1 Connection Diagram – Standard Setup

For connection diagram in the Raychem PLI module Demo Unit, please refer to Appendix A.



Section – 2 Information Charts

2.1 RTD Switch Settings

	Circuit #3	
A	118°F	48°C
B	147°F	64°C
C	159°F	71°C
D	188°F	87°C
E	Shorted	
F	Open	

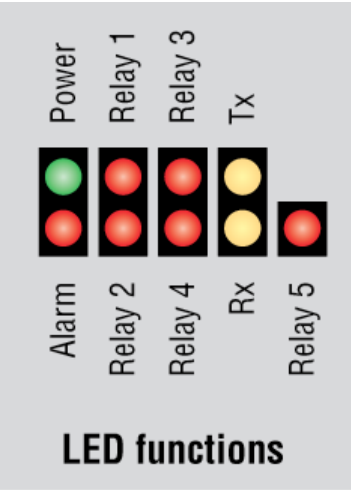
	Circuit #4	
A	116°F	47°C
B	147°F	64°C
C	159°F	71°C
D	190°F	88°C
E	Shorted	
F	Open	

2.2 Color Coding of Main Screen

The data in the °F/°C, A, and G.F. columns are displayed in color to identify their current state.

Color	Description
Green	When heater is energized (status On), within normal range of setup parameters
Red	In alarm condition
Orange (°F/°C only)	Temperature not within setpoint + dead band range

2.3 NGC-30-CRM/-CRMS LED Functions

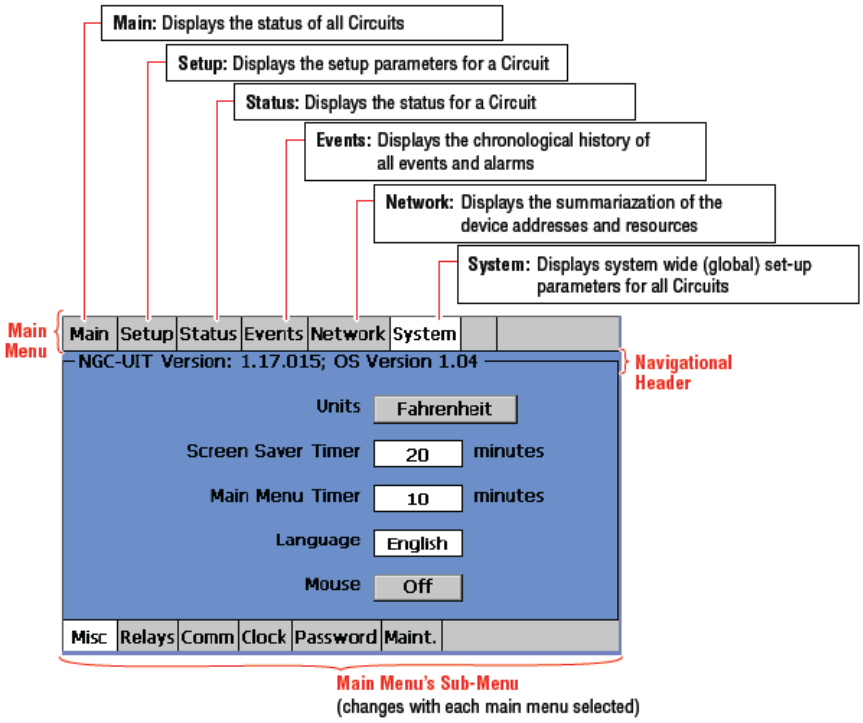


Section – 3 Main Screen and Events/Alarms Navigation

3.1 Navigating Between Screens

The top row of the screen contains the main menu buttons, and the bottom row contains subsets of those main menu buttons.

To navigate between screens, simply press a combination of a Main Menu|Submenu button



3.2 Navigation Buttons

At the bottom of the Main screen and Events screen, the navigation buttons will appear once 6 events have occurred. Use these buttons to scroll up and down to view the status of the circuits on the Main screen, and on the Events/Alarms on the Events screen.

When in the Main or Events/Alarms screens, pressing on any data field for a cCircuit causes the display to show the Status screen for that circuit.

	Top of list	When selected, displays the first 5 circuits of the Main and the Events screens.
	Page up	When selected, displays the previous 5 circuits of the Main and the Events screens.
	Move up one Circuit	When selected, displays the previous circuit on the Main and the Events screens.
	Move down one Circuit	When selected, displays the next circuit on the Main and the Events screens.
	Page down	When selected, displays the next 5 circuits of the Main and the Events screens.

	Bottom of list	When selected, displays the last 5 circuits of the Main and the Events screens.

3.3 Navigational Header

At the top of the Setup and Status screens, a navigational header displays the following data (from left to right):

A. The Circuit Number (3)

B. The Circuit's ID tag (Pipe #3 Feed Line)

C. The Relay output device address (01)

D. The Relay output number (3)

Section – 4 NGC-UIT Software Upgrade Process

The NGC-30 UIT Software can be upgraded using a memory stick and the USB Port on the NGC-UIT.

4.1 Upgrade Process

Step 1

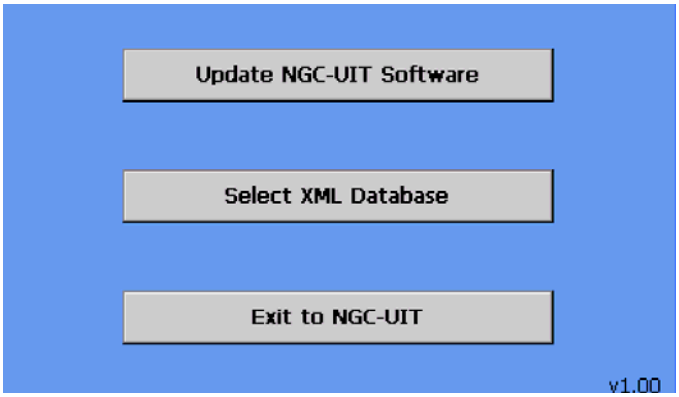
Copy the entire folder labeled "Setup", where the new NGC software version is saved, to the USB memory stick.

Step 2

Insert the USB flash drive with the new software into the USB port on the front of the NGC Demo Unit.

Step 3A (For UIT Software versions 1.17.34 and lower, running on a NGC-UIT)

For UIT Software versions 1.17.34 and lower, the User Interface Terminal must have power cycled to recognize a USB memory stick. Recycle power to the NGC-UIT. This can be accomplished by turning off and then on the power switch button on the right side of the Demo Unit. Once the NGC-UIT program has rebooted with the flash drive in the USB port, the program will automatically display a screen with three options as indicated below.



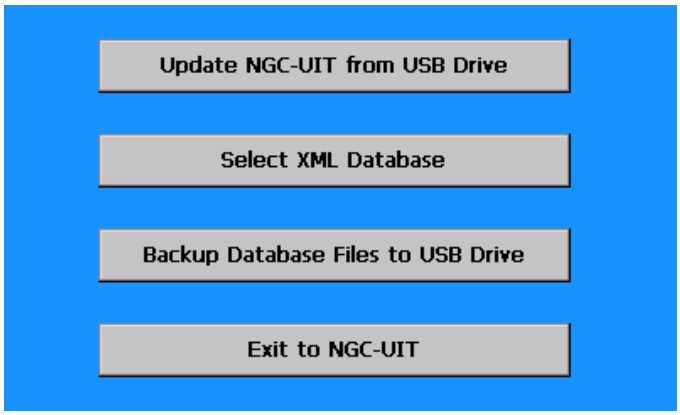
Step 3B (For UIT Software version 1.17.35 and higher, running on a NGC-UIT)

UIT Software versions 1.17.35 and higher do not require power cycle, the NGC-UIT can recognize the USB stick with or without power cycling.

While NGC-UIT Program is running, insert the USB flash drive with the new software version into the USB port in front of the Demo Unit. Wait approximately one minute until the program displays the selection screen. This screen will indicate four options, as shown below:

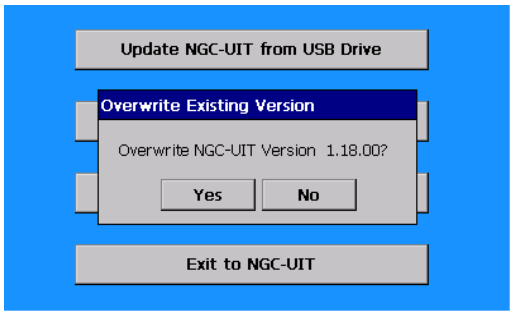
Step 4

Choose the **Update NGC-UIT from USB Drive** option by pressing that button on the screen.



Step 5

The program will prompt you to confirm whether overwrite the current program is acceptable, See below. Press "Yes" button.



Step 6

Wait till the load process is completed.

Step 7

If the Demo Unit has not been set to the Demo Mode yet, please proceed to the Section 5 *"Setting NGC-UIT Program to Demo Mode".*

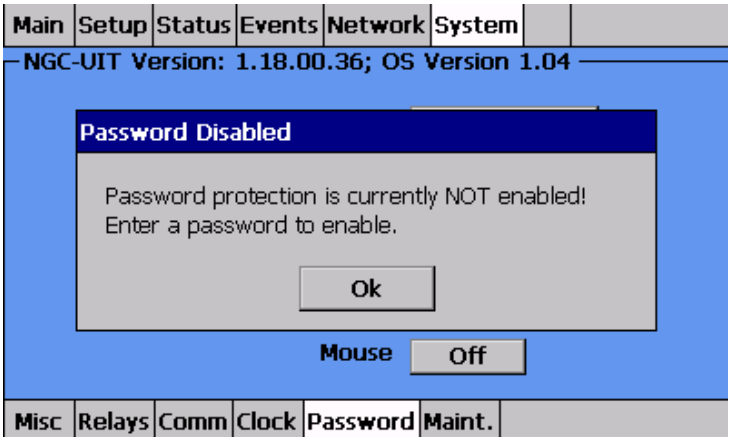
Section – 5 Setting NGC-UIT Program to Demo Mode

This step needs to be completed just once on each Demo Unit in order to be used with PLI module and standard operation. The PLI module works only with CRM boards. Since the Demo Unit is configured as a CRMS board, this step is required to allow the PLI module operation with the Demo Unit. We recommend that all Demo Units are set to the Demo Mode since this step would not have any impact on the standard operation of the Demo Unit.

5.1 Demo Mode Configuration Process

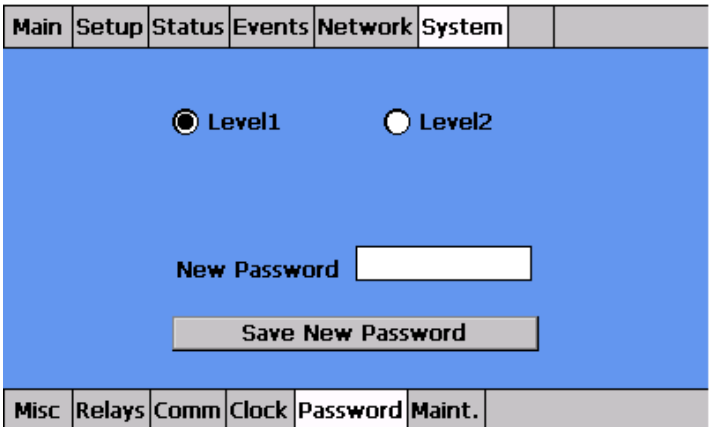
Step 1: Go to System|Password Screen

While the program is running, go to the System|Password screen and press "OK" for entering a password.



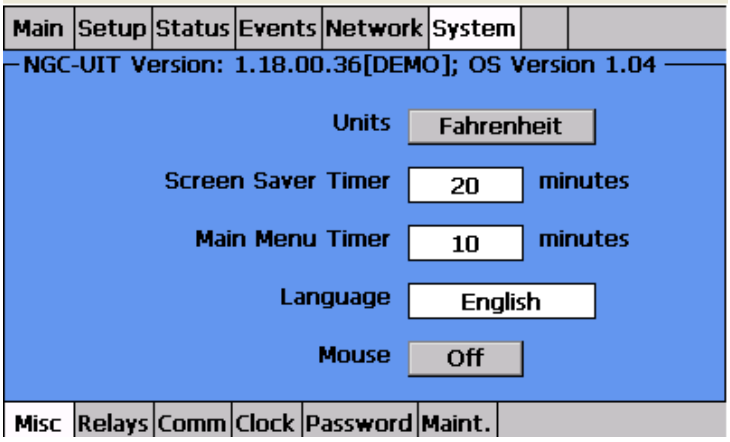
Step 2: Enter Password

Select Level 1 Access. Enter the Password "DEMO". Save the new password and confirm the saved password.



Step 3: Demo Mode Verification

Go to the System|Misc. screen. On the Top of the screen, the word "DEMO" is now added after the software version. See Figure below.

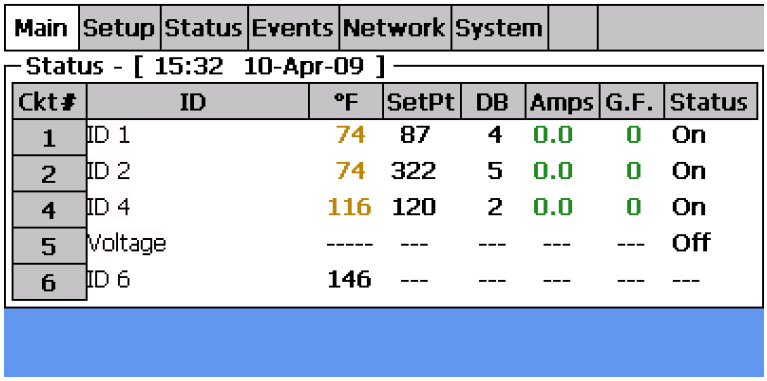


Section – 6 Quick Start for Demo

6.1 Setup of Circuit 3

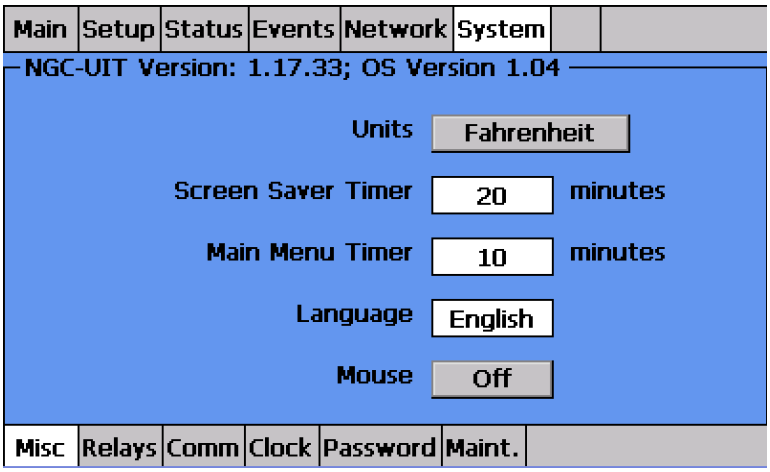
The following is a typical heat-tracing system for Circuit 3 Setup.

This is the first screen that appears when the program loads.


Main
Setup
Status
Events
Network
System
Status - [15:32 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 ID 1 74 87 4 0.0 0 On
2 ID 2 74 322 5 0.0 0 On
4 ID 4 116 120 2 0.0 0 On
5 Voltage ----- --- --- --- --- Off
6 ID 6 146 --- --- --- --- ---

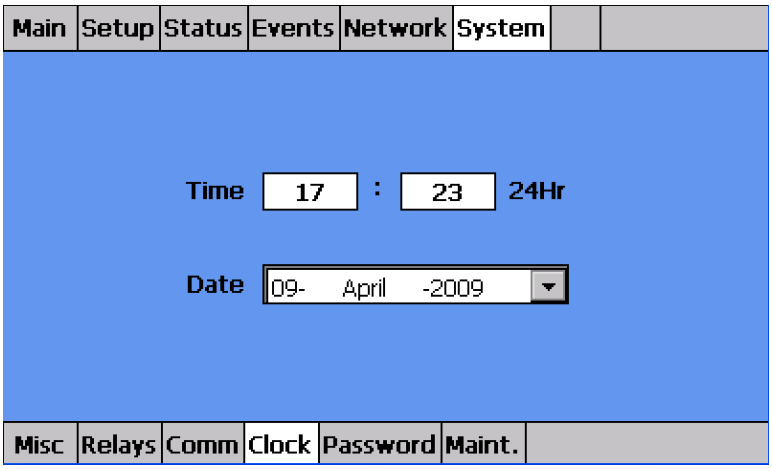
Step 1: Setting up Units and Language

Go to the System|Misc screen and enter the appropriate Units and Language.



Step 2: Setting Time and Date

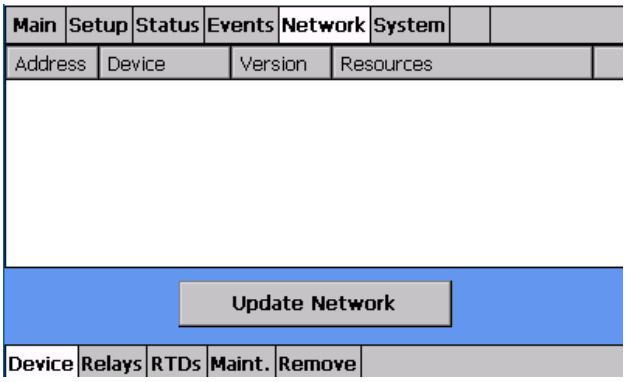
Go to the System|Clock screen and set the time and date.



Step 3: Setting the Network for Device(s)

Go to the Network|Device screen.

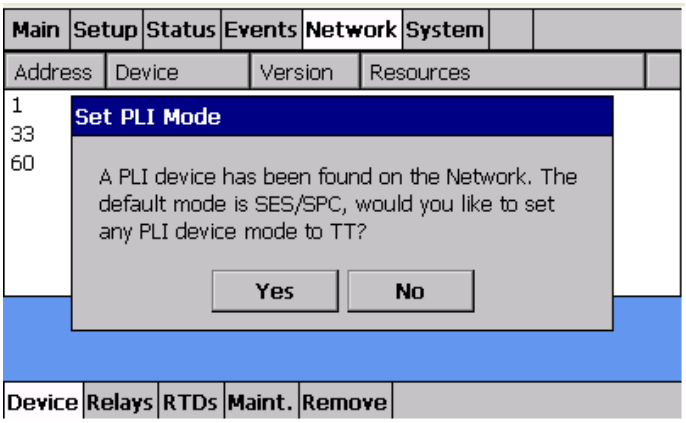
For the very first time, the Network screen will be blank. See below.



Press "Update Network" and scan all NGC-30-CRM/-CRMS (5GF-C) boards, RMM2 and/or PLI modules into the network database. The Device Addresses for the NGC-30-CRM/-CRMS (5GF-C), RMM2 and PLI module will be scanned and a database will be created. A device address is the number assigned via the rotary switches on the NGC-30-CRM/-CRMS (5GF-C) board, RMM2, PLI module.

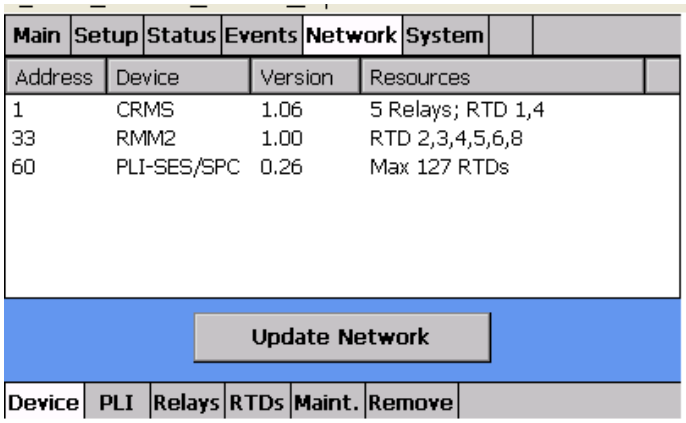
Once the database exists, no further scanning is done unless the system is forced to update the network by activating the "Update Network" button.

If a PLI (Power Line Carrier Interface) module is detected in the scanning process, a pop-up window will open, asking whether the PLI Mode should be changed from the default mode of PLI-SES/SPC to the PLI-TT. Since the PLI Module Demo Unit includes a SES and SPC Transmitter, the option "NO" should be selected.



IMPORTANT: The NGC-30 Control System can support up to 4 PLI modules. Each PLI module can support up to 127 SES or SPC transmitters and up to 255 700-TT transmitters. The SES/SPC and 700-TT transmitters cannot be connected to the same PLI module.

The Network will then be updated with the connected devices, in this case with one NGC-30-CRMS board, one RMM2 and one PLI-SES/SPC module.

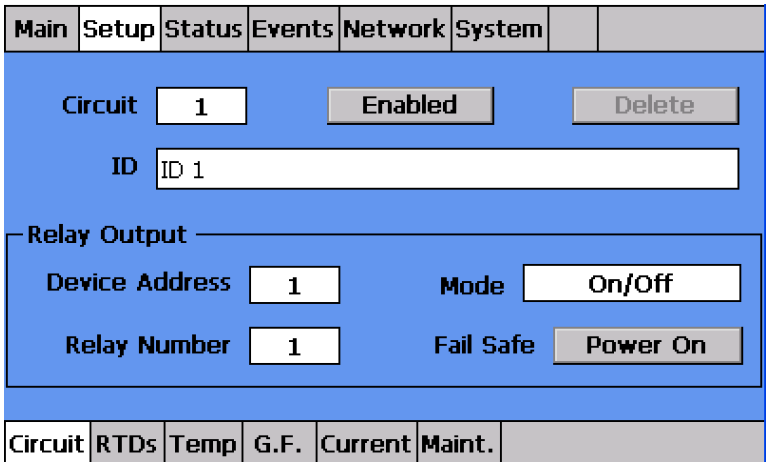


When a PLI module is detected in the Update Network process, the PLI tab will be added to the Network and Setup Sub-Menus.

IMPORTANT: For CRM/CRMS boards and RMM2 modules, the Resources Column indicates the RTDs that are available for use in the Setup|RTD Screen. However, the Resources Column for PLI-SES/SPC or PLI-TT indicates the maximum number of RTDs that could be used. Please refer to heater isometric drawings for each circuit for the assigned transmitters/RTD addresses to each circuit.

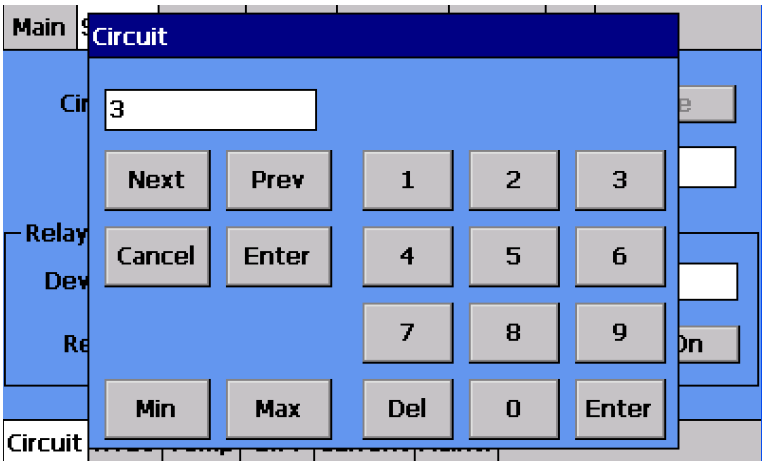
Step 4: Setting up a Circuit

Step 4A: Go to the Setup|Circuit screen.



At initial start-up, the Setup|Circuit screen automatically displays Circuit 1.

Step 4B: Press on the Circuit field and a pop-up window appears.



For this example, Circuit 3 was entered.

Press Enter when done.

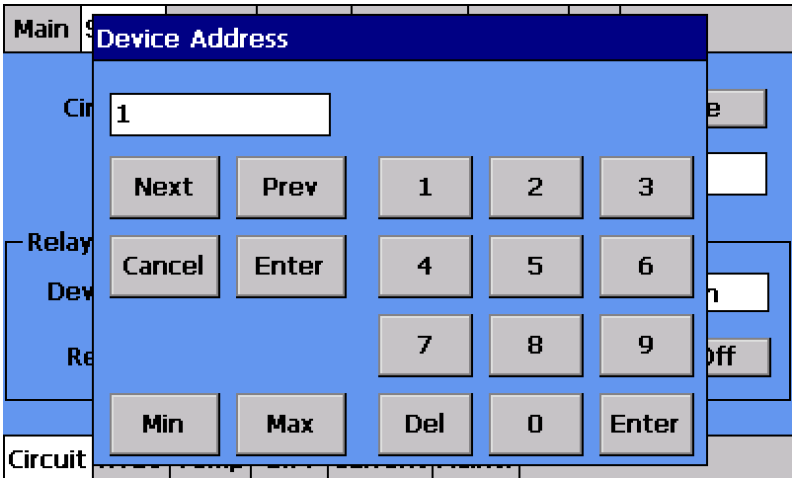
Step 4C: Press on the ID field and a pop-up window appears.

The pop-up window is a text-editing screen that works similar to cell phone text messaging. There are selection keys for Upper Case Letters, Lower Case Letters, and Special Characters. The keypad portion allows text to be entered by pushing the appropriate keys.

For this example, Pipe #3 was entered for the ID tag.

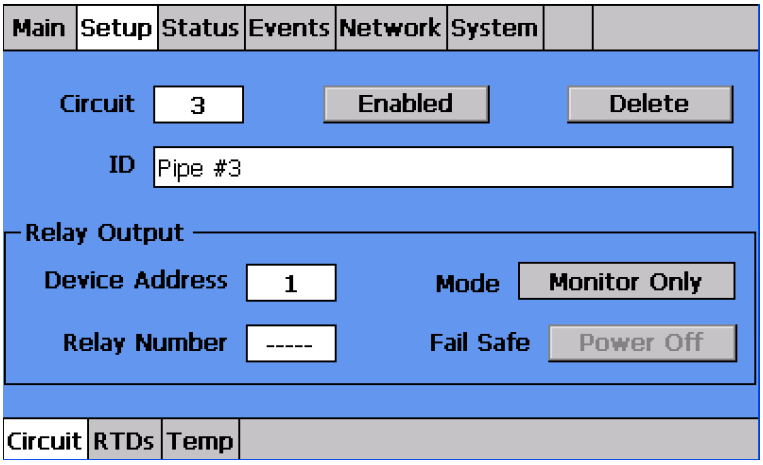
Press Enter when done.

Step 4D: Press on the Device Address window.

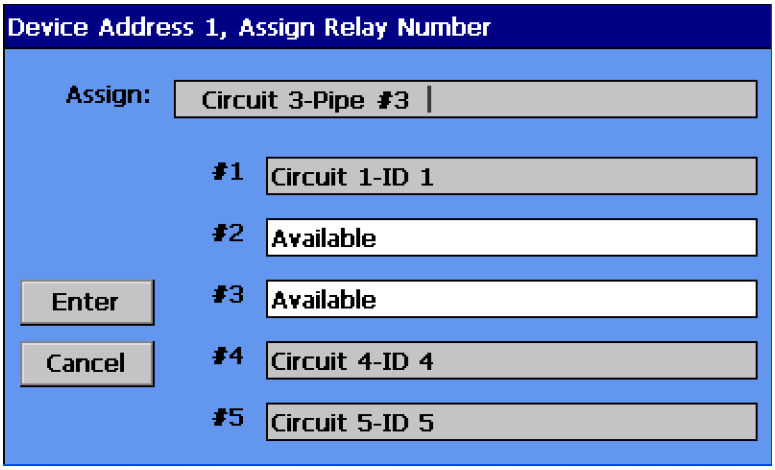


A numeric entry pop-up window appears. Type in the device address (in this case, 1) for this Circuit and hit Enter.

Step 4E: Press on the relay Number field.



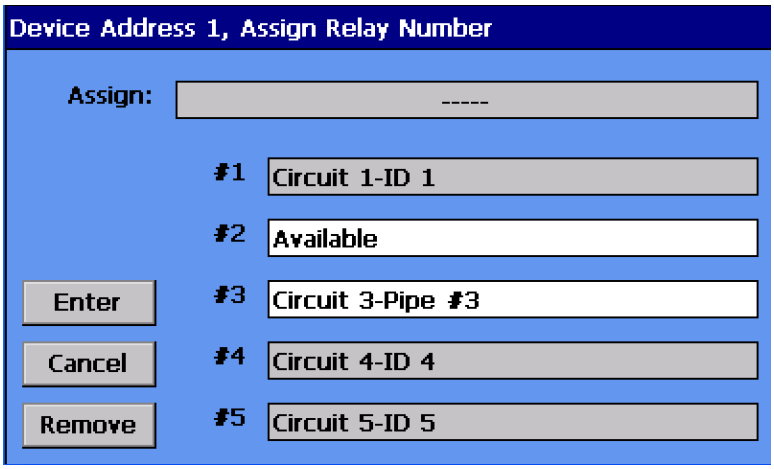
Step 4E continued: This screen shows the pop-up window prior to any relay assignment.



Press on the word 'Available' to the right of #3 to assign Relay 3 as the output device for Circuit 3.

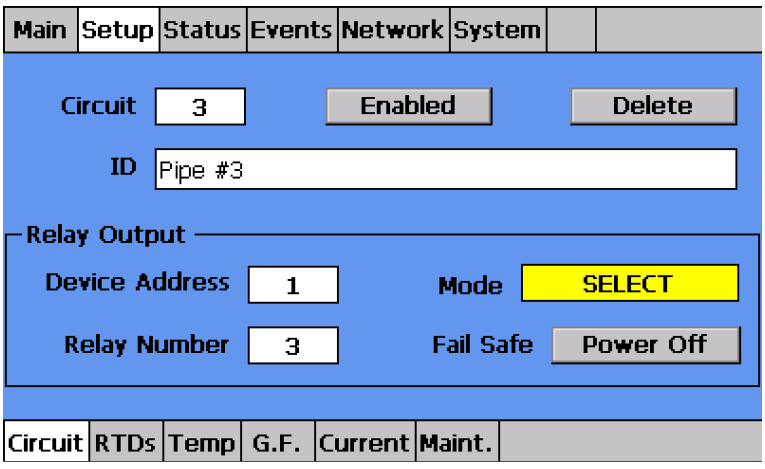
IMPORTANT: The screen will always display which Relays are still available on this device for Circuit assignment.

Step 4E continued: Press Enter after Relay assignment to return to the Setup screen.

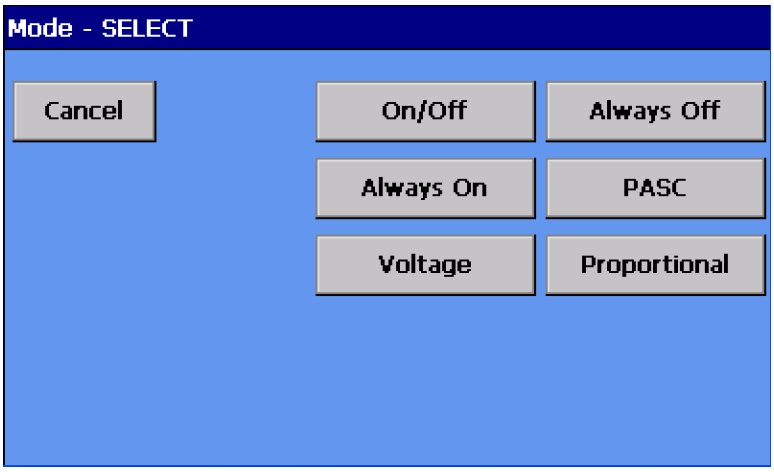


Press enter.

Step 4F: Press on the Mode field and a pop-up window appears, showing all available control modes.



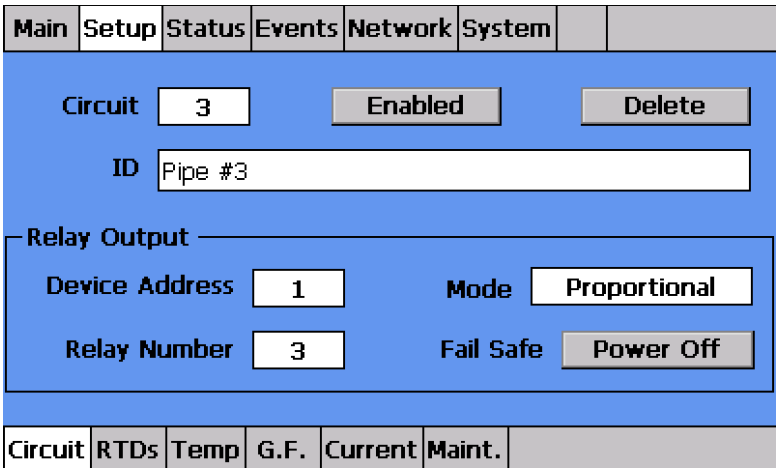
Step 4F: Continued. Pop-up window for control Mode appears.



This pop-up window allows selection of a Circuit's basic operating mode. The NGC-30-CRM (5GF-C), used in this example, has available Control modes: On/Off, Always On, Voltage, Always Off, PASC and Proportional.

Press Proportional to select this control mode and return to the Circuit setup screen.

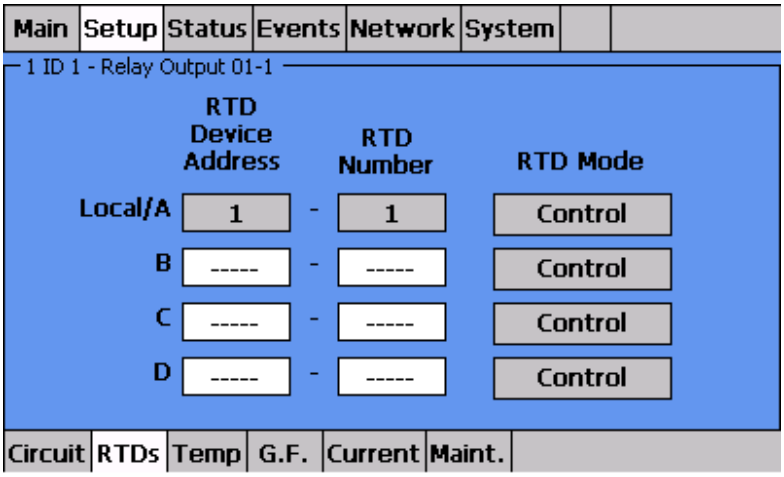
Step 5: Review the Fail Safe setting.



Pressing the Fail Safe toggle button alternates the Fail Safe mode between Power Off and Power On. This selection tells the NGC-30-CRM/-CRMS (5GF-C) if the heater should be turned on or off if all of the RTD(s) for this Circuit fail.

If the main concern is to prevent pipes from freezing, then Power On is a good choice. However, if the heater is oversized and overheating is a concern, then Power Off could be a better choice.

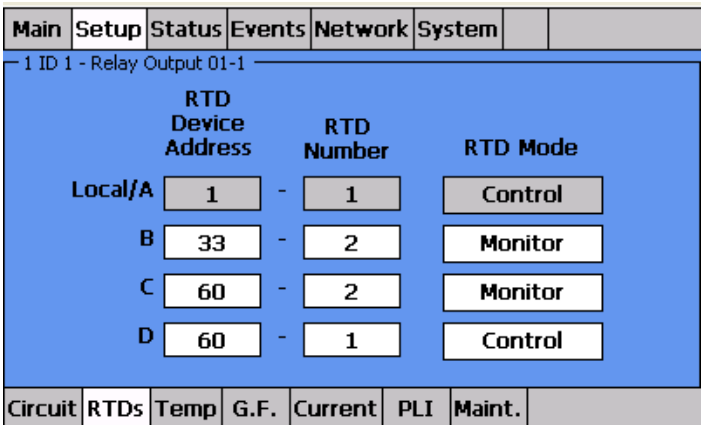
Step 6: Go to Setup|RTDs screen.



The NGC-30 program first checks to see if the default RTD is available. On any NGC-30-CRM/-CRMS (5GF-C) board, the first RTD input is automatically coupled with the first relay output; the second RTD is linked with the second output relay, etc.

The Figure below indicates an RTD connected to the RTD 1 terminal block, so the RTD set-up screen indicates the default assignment is already completed.

There are three blank slots available so that additional RTDs can be assigned to this output relay. Additional RTDs may be desired if a more exact temperature sampling for a temperature-sensitive fluid is needed. If additional RTDs are assigned, the lowest RTD value from the list will be used for control temperature.

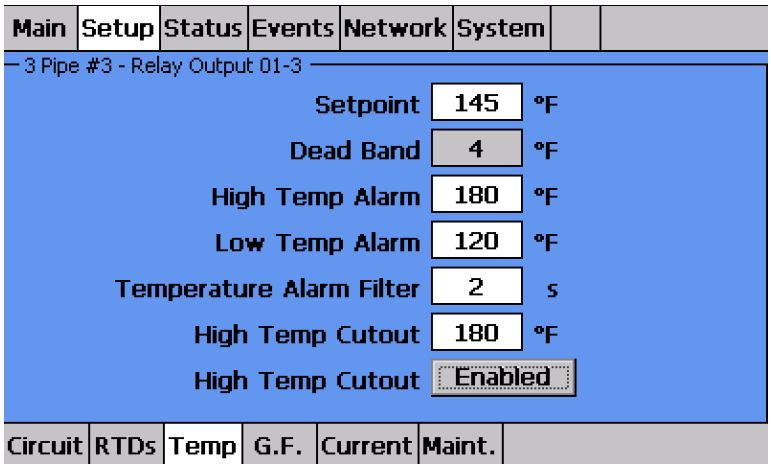


Temperature Data Transfer from RTD Sensor to NGC-30 Controller	RS-485 Device	RTD Connectivity to first RS-485 Device	RTD Modes		
			Control	Monitor	Continuity
RTD → CRM/CRMS (same circuit)	CRM/CRMS (same circuit)	direct	X	--	--
RTD → CRM/CRMS (another circuit) → NGC-UIT → CRM/CRMS (same circuit)	CRM/CRMS (another circuit) NGC-UIT CRM/CRMS (same circuit)	direct	X	X	--
RTD → RMM2 → NGC-UIT → CRM/CRMS	RMM2 NGC-UIT CRM/CRMS	direct	X	X	--
RTD → SES-RTD → PLI-SES/SPC → NGC-UIT → CRM	PLI-SES/SPC NGC-UIT CRM	via SES-RTD	X	X	--
RTD → SPC-P or SPC-W → PLI-SES/SPC → NGC-UIT → CRM	PLI-SES/SPC NGC-UIT CRM	via SPC-P or SPC-W	X	X	--
RTD → 700-TT → PLI-TT → NGC-UIT → CRM	PLI-TT NGC-UIT CRM	via 700-TT	X	X	--
SES-CONT → PLI-SES/SPC → NGC-UIT → CRM	PLI-SES/SPC NGC-UIT CRM	via SES-CONT (No RTD)	--	--	X

The RTD Mode, *Control* is automatically selected if an RTD is directly connected to the same circuit. For all other RTDs assigned to that circuit, regardless of the source, the RTD Mode of *Control* or *Monitor* can be selected. In Monitor Mode, the temperature values will be monitored.

IMPORTANT: The SES-CONT device does not have any RTDs, thus cannot control or monitor the temperature. Therefore, the only RTD Mode that can be selected is *Continuity*. In Continuity Mode, the integrity of the heat-tracing system is monitored.

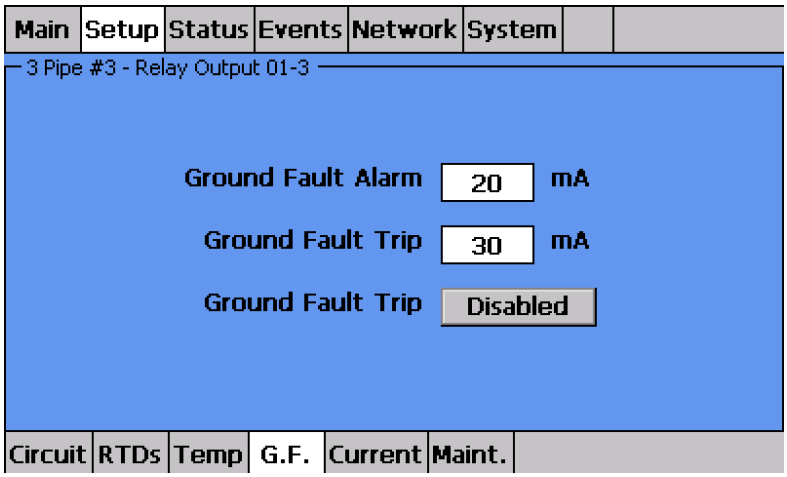
Step 7: Go to the Setup|Temp screen.



Input the Setpoint, High Temp Alarm and Low Temp Alarm by pressing on each of the four numeric fields in turn, and enter the values using the pop-up number pad. Press Enter when done.

For this example, the Setpoint temperature is 145°F, and high and low temperature alarms at 180°F and 120°F respectively.

Step 8: Go to Setup|G.F. screen



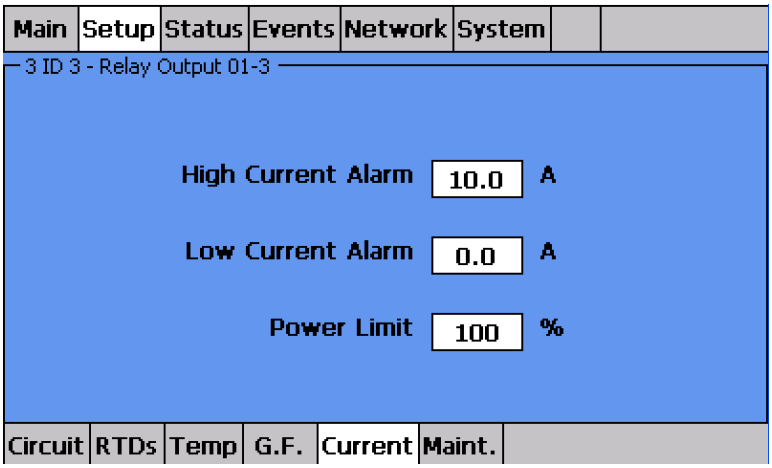
Input the Ground-Fault Alarm and Ground-Fault Trip by pressing each of the two numeric fields in turn, and enter the values using the pop-up number pad. Press Enter when done.

For this example, the Ground-Fault Current Alarm and Ground-Fault Current Trip levels are set to 20 mA and 30 mA respectively.

- At less than 20 mA, the NGC-30 program takes no action. At 20 mA or more leakage, an alarm is indicated and logged to the Events List.
- At 30 mA the output relay assigned to this Circuit is tripped off.

⚠ **WARNING: Fire Hazard.** A ground-fault alarm means the heating cable has been damaged or improperly installed and must not be ignored. Disabling the ground-fault trip function reduces safety and could result in sustained electrical arcing or fire. To minimize the risk of fire if the alarm activates, shut off the power and repair the system immediately.

Step 9: Go to Setup|Current screen.



Input the High Current Alarm and Low Current Alarm by pressing each of the two numeric fields in turn, and enter the values using the pop-up number pad. Press Enter when done. For this example, High Current Alarm is set to 10 A, and Low Current Alarm is set to 0 A.

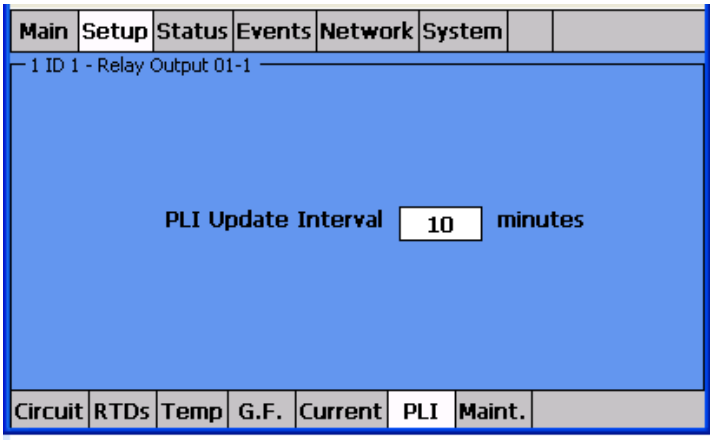
IMPORTANT: Setting 0 for both High and Low Current Alarms completely deactivates the Current Alarm function.

Input Power Limit – This input is enabled only when SSR control devices are detected (NGC-30-CRMS panel). A Power Limit setting less than 100% will limit the "on-time" of a constant wattage heater to the percentage indicated in the entry window. This has the effect of lowering the amount of power that the heater can produce.

IMPORTANT: Power Limiting is not recommended if self-regulating heaters are installed.

Step 10: Go to Setup|PLI Screen (If PLI modules are installed)

This window allows you to set the update time when using a PLI module. The update time, in minutes, is used as the time that is waited before polling the sensor(s) for a new temperature on a circuit after the circuit has turned off. The sensors are continuously polled while the circuit is on.



The default value for *PLI module Update Interval* is 10 minutes. For demo purposes only, change the value to one (1) minute to read the temperature measurements more often.

Heater On - When the heating cable is ON, the temperature measurements will be transmitted from the SES and SPC transmitters to the PLI module/NGC-30 Controller approximately every 5 to 11 minutes depending on the SES address. When using 700-TT transmitters, the temperature data will be polled periodically. The time interval is within minutes and depends on the number of 700TT transmitters and the number of connected circuits.

Heater OFF - When the heating cable is OFF, the temperature measurements will be transmitted from the SES, SPC and 700-TT transmitters to the PLI module/NGC-30 Controller based on the configured *PLI module Update Interval* time. The NGC-30 system turns the heater on in the time intervals defined in the field *PLI Module Update Interval* and reads the temperature measurements. Based on these temperature measurements and the Setpoint, NGC-30 Control System determines whether to leave the heater On or turn it Off.

If the *Update Interval* time is set to 10 minutes, the NGC-30 control system turns ON the heater every 10 minutes.

On time duration when no additional heat is required is as follows:

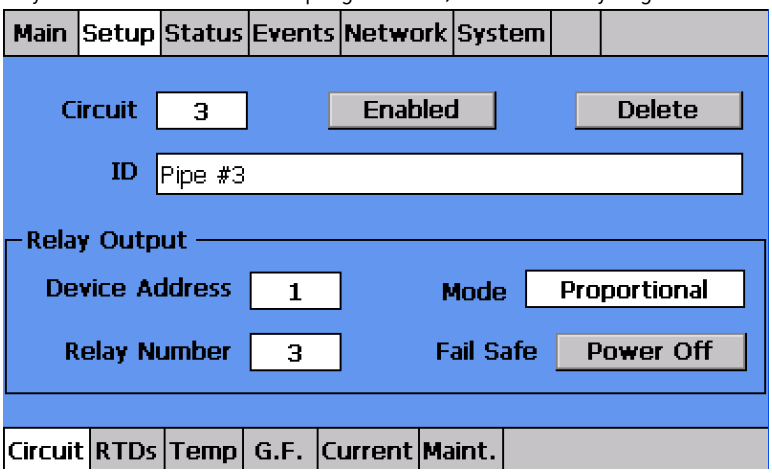
- For 700-TT Transmitter ..... 5 seconds
- For SES Transmitter .....Highest SES Address Number for that circuit / 2 + 5 = in seconds

Range: 1-255 Minutes

Default: 10 Minutes

Step 11: Enable or Disable the Circuit.

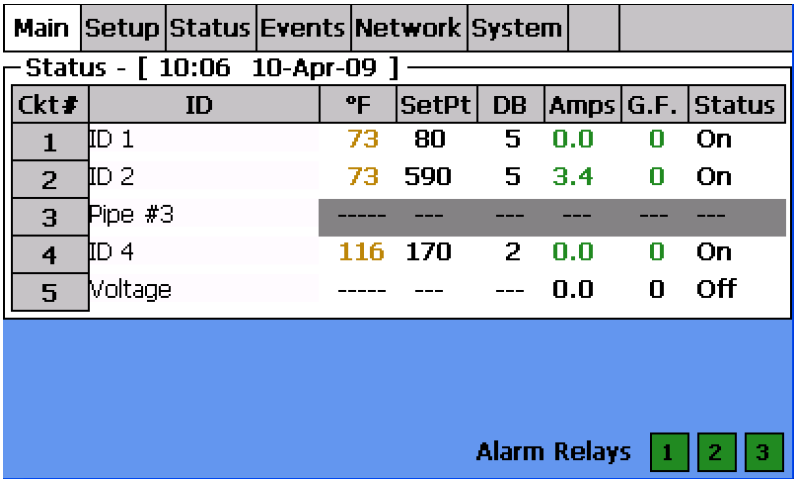
By default once a Circuit is programmed, it immediately begins to control the heater



based upon the input information

If you do not want this Circuit to activate until all Circuits are programmed, go to Setup|Circuit screen, and press the Enabled toggle button once, which then takes the Circuit Disabled. To re-Enable, press the Disable button.

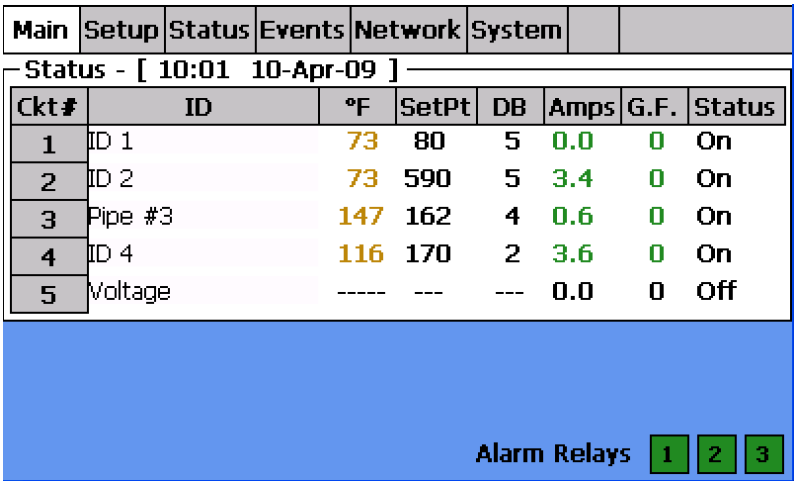
Circuit 3 Disabled


Main
Setup
Status
Events
Network
System
Status - [10:06 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 ID 1 73 80 5 0.0 0 On
2 ID 2 73 590 5 3.4 0 On
3 Pipe #3 ----- --- --- --- --- ---
4 ID 4 116 170 2 0.0 0 On
5 Voltage ----- --- --- 0.0 0 Off
Alarm Relays 1 2 3

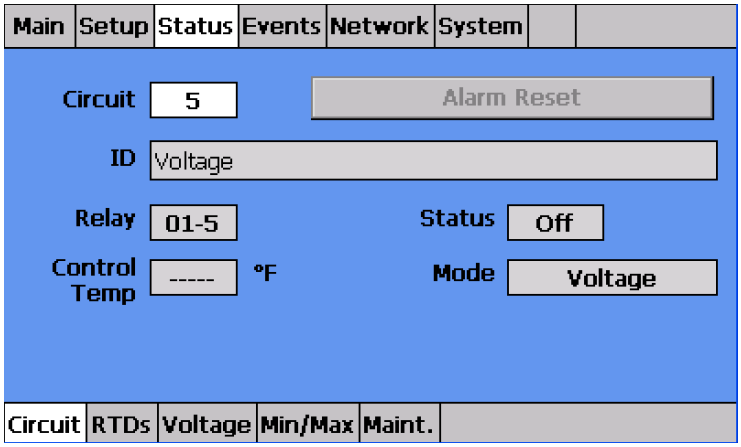
On the Main menu screen, any Disabled Circuit is grayed out as above

6.1.1 CIRCUIT 3 SETUP COMPLETE CONFIRMATION

After completing the Setup for Circuit 3 and Circuits are Enabled, go to the Main screen to confirm all circuits are activated and working properly.


Main
Setup
Status
Events
Network
System
Status - [10:01 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 ID 1 73 80 5 0.0 0 On
2 ID 2 73 590 5 3.4 0 On
3 Pipe #3 147 162 4 0.6 0 On
4 ID 4 116 170 2 3.6 0 On
5 Voltage ----- --- --- 0.0 0 Off
Alarm Relays 1 2 3

6.1.2 CIRCUIT 5 VOLTAGE MONITORING – STATUS ONLY



Monitor's line voltage from the NGC-30-CRM/-CRMS (5GF-C).

Go to the status screen for Circuit 5 by either

1. Press on Circuit's 5 ID name (Voltage) or
2. Press on Status|Circuit, press on Circuit field and select 5 and Enter.

6.2 Creating Alarms

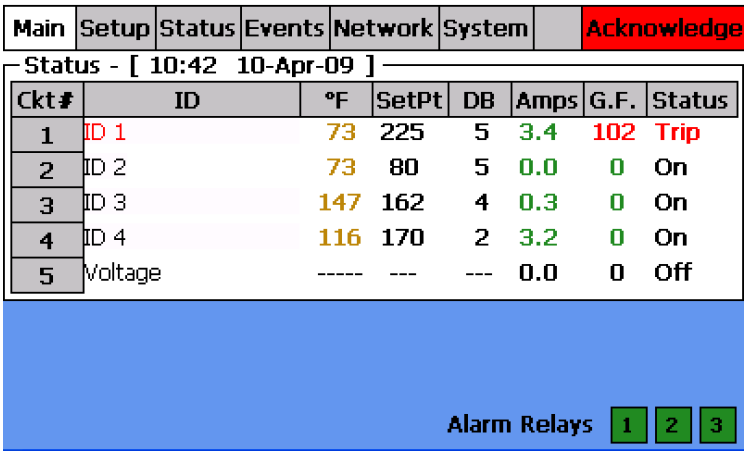
6.2.1 GROUND-FAULT TRIP ALARM

Using Circuit 1

Press the ground-fault button on the front panel.

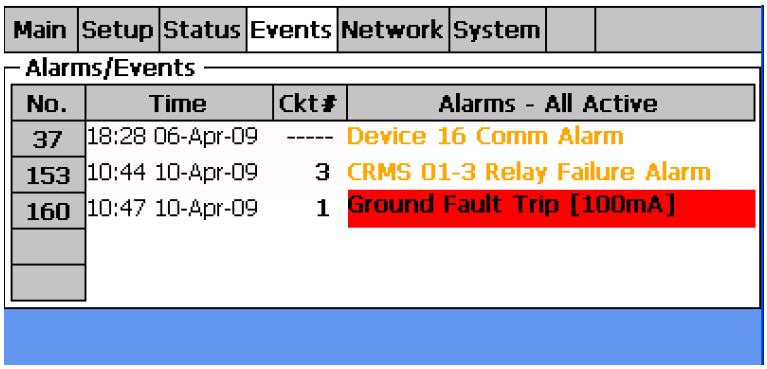
IMPORTANT: Circuit 1 must be on.

Go to Main screen


Main
Setup
Status
Events
Network
System
Acknowledge
Status - [10:42 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 ID 1 73 225 5 3.4 102 Trip
2 ID 2 73 80 5 0.0 0 On
3 ID 3 147 162 4 0.3 0 On
4 ID 4 116 170 2 3.2 0 On
5 Voltage ----- --- --- 0.0 0 Off
Alarm Relays 1 2 3

Notice, Heater (light) turned off, Relay status Trip.

Press Acknowledge button

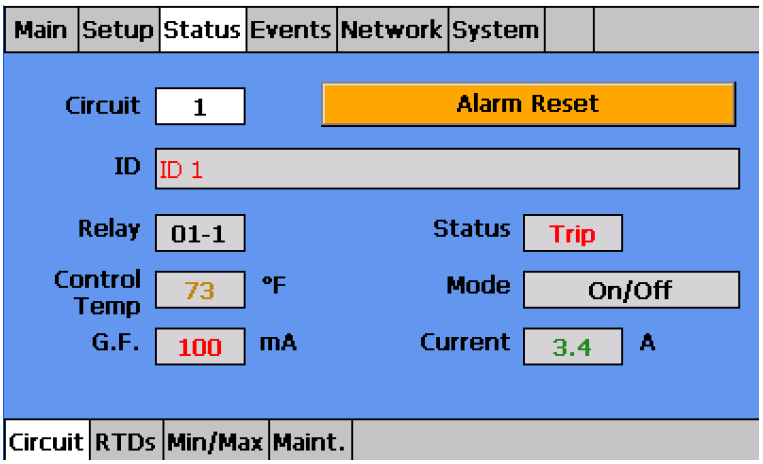


Automatically brings you to the Events|Alarm screen detailing the Ground-Fault Trip alarm.

The high Ground-Fault Trip is a latching alarm, (notice it is blinking red/orange) and requires user action to reset.

Press on Ground Fault Trip [60 mA]

Automatically brings you to Status|Circuit screen for Circuit 1



Notice the Alarm Reset button is blinking red/orange.

Circuit will not reset until Ground-Fault condition does not exist.

Press on **Alarm Reset** to reset alarm.

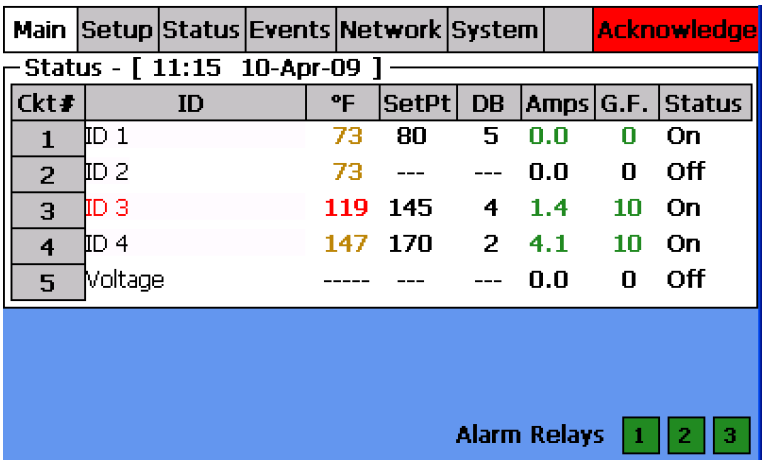
6.2.2 LOW AND HIGH TEMPERATURE ALARMS

Using Dials on Front Panel

RTD Temperature, Heater Current and Ground-Fault Current for Circuit 3 and 4 can be changed via the dials on the front panel. The following example can be applied to either Circuit 3 or Circuit 4. For this example, Circuit 3 was used.

Low Temperature Alarm

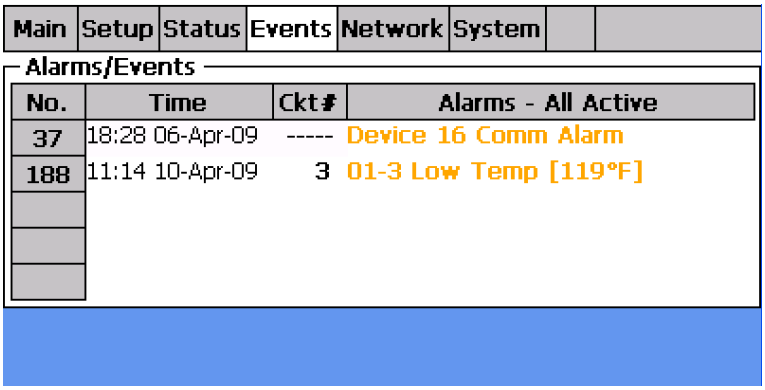
Turn Circuit 3 Temperature dial to A on the front panel.


Main
Setup
Status
Events
Network
System
Acknowledge
Status - [11:15 10-Apr-09]
Ckt# ID °F SetPt DB Amps G.F. Status
1 ID 1 73 80 5 0.0 0 On
2 ID 2 73 --- --- 0.0 0 Off
3 ID 3 119 145 4 1.4 10 On
4 ID 4 147 170 2 4.1 10 On
5 Voltage ----- --- --- 0.0 0 Off
Alarm Relays 1 2 3

Notice ID and °F in **Red**

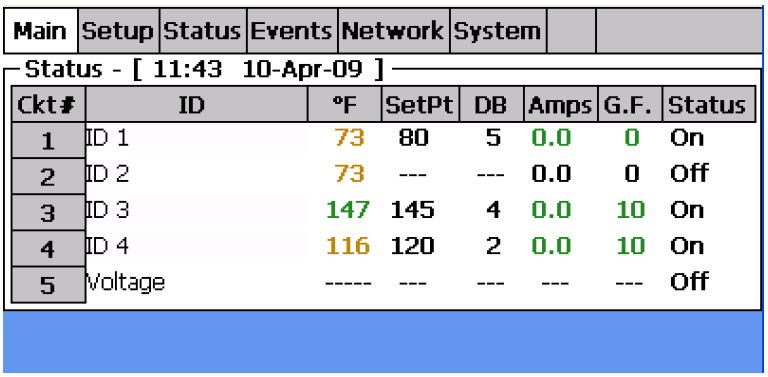
IMPORTANT: After a 15-second timeout, the Acknowledge and Alarm light will turn on.

Press Acknowledge button



Automatically brings you to the Events|Alarm screen detailing the resent alarm

Press Main to go to the Main screen



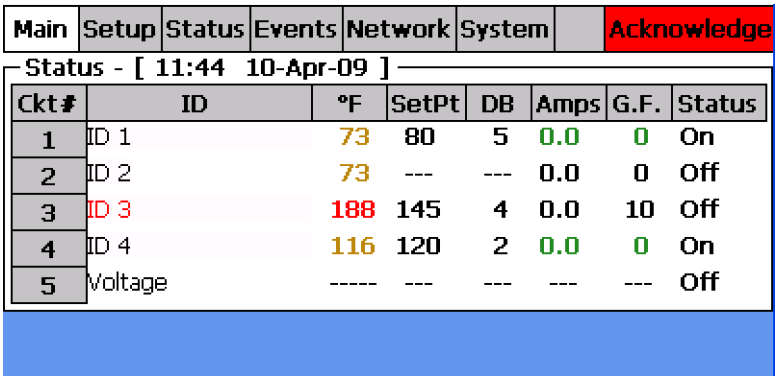
Turn Circuit 3 temperature dial back to B .

Notice Low Temperature alarm cleared.

Circuit 3's ID is now black and °F in **Green**

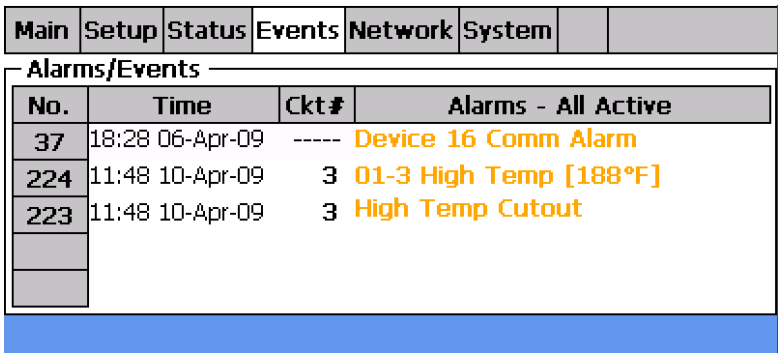
High Temperature Alarm

Turn Circuit 3 Temperature dial to D.



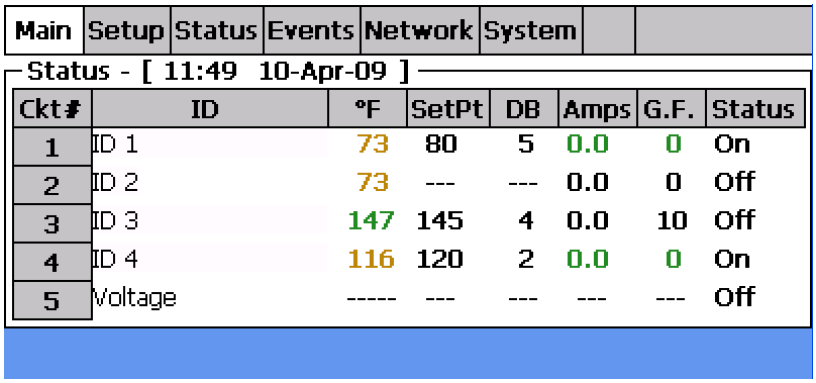
Notice ID and °F in **Red**

Press Acknowledge button



Automatically brings you to the Events|Alarm screen detailing the resent alarm.

Press Main to go to the Main screen



Turn Circuit 3 temperature dial, on the front panel of the demo unit, back to B.

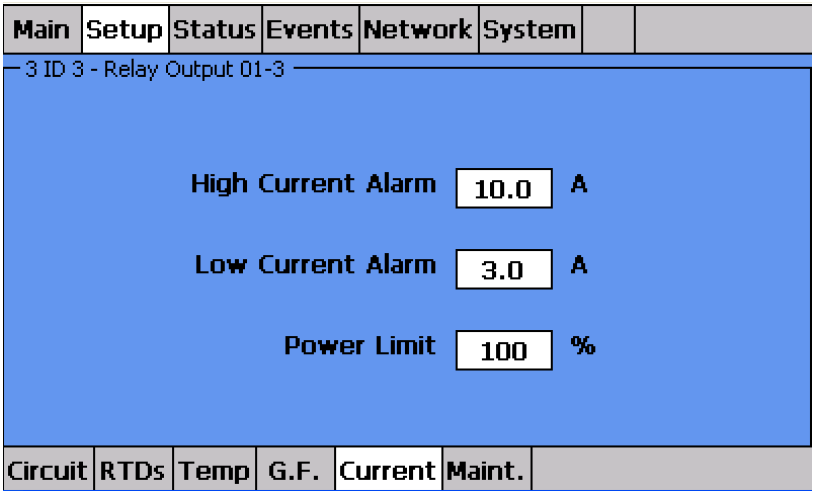
Notice High Temperature alarm cleared.

Circuit 3's ID is now black and °F in **Green.**

6.2.3 LOW AND HIGH CURRENT ALARMS

Low Current Alarm

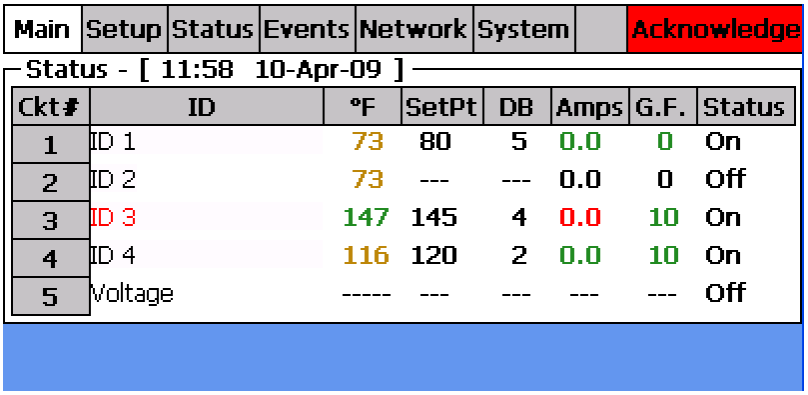
Go to Setup|Current screen for Circuit 3 and change the Low/High Current Alarm to 3 and



10.0 A.

Turn Circuit 3 Line Current Dial, on the front panel of the demo unit, counter clockwise until it stops.

Press Main to go to the Main screen

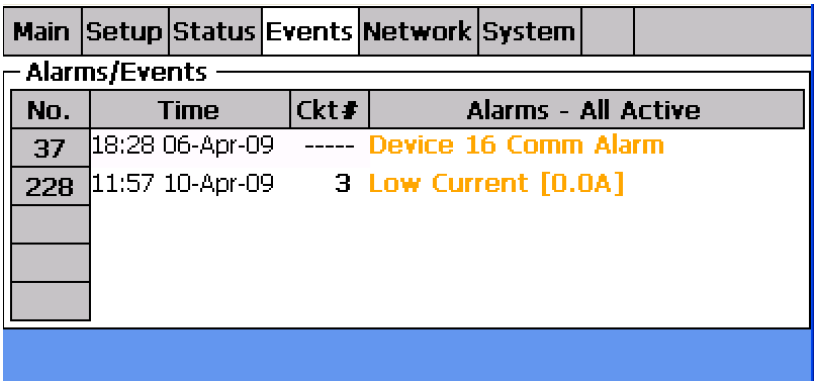


Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	73	80	5	0.0	0	On
2	ID 2	73	---	---	0.0	0	Off
3	ID 3	147	145	4	0.0	10	On
4	ID 4	116	120	2	0.0	10	On
5	Voltage	-----	---	---	---	---	Off

Notice ID and Amps are in **Red** for Circuit 3.

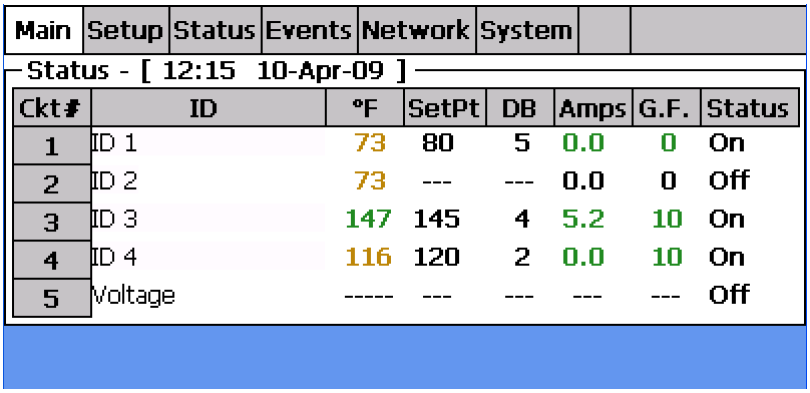
IMPORTANT: Alarm will not show up until after 1 minute.

Press Acknowledge button



Automatically brings you to the Events||Alarm screen detailing the recent alarm.

Press Main to go to the Main screen

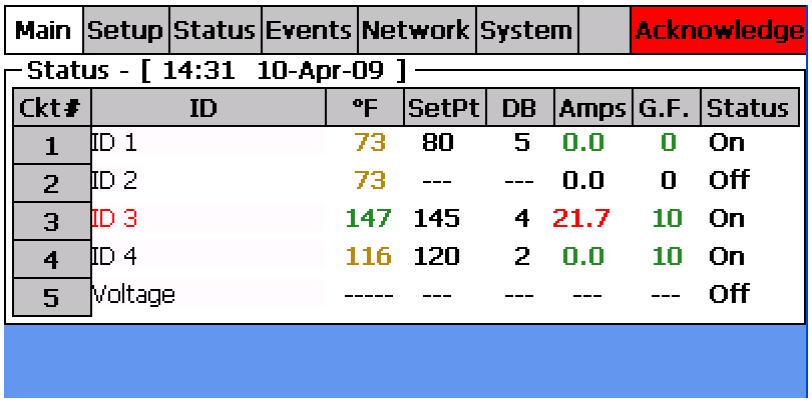


Turn Circuit 3 Line Current dial, on the front panel of the demo unit, clockwise until A is between 3.0 and 10.0 A.

Notice Low current alarm is cleared.

Circuit 3's ID is now in black and Amps in Green.

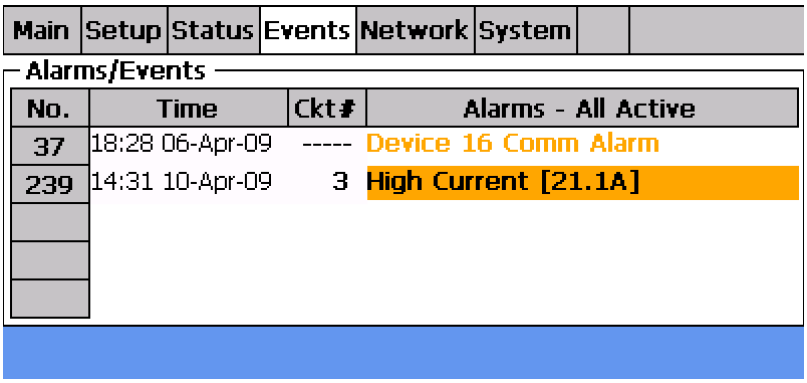
6.2.4 HIGH CURRENT ALARM



Turn Circuit 3 Line Current dial, on the front panel of the demo unit, clockwise until it stops.

After approximately 1 minute of time, Circuit 3 is now in high current alarm.

Press Acknowledge button

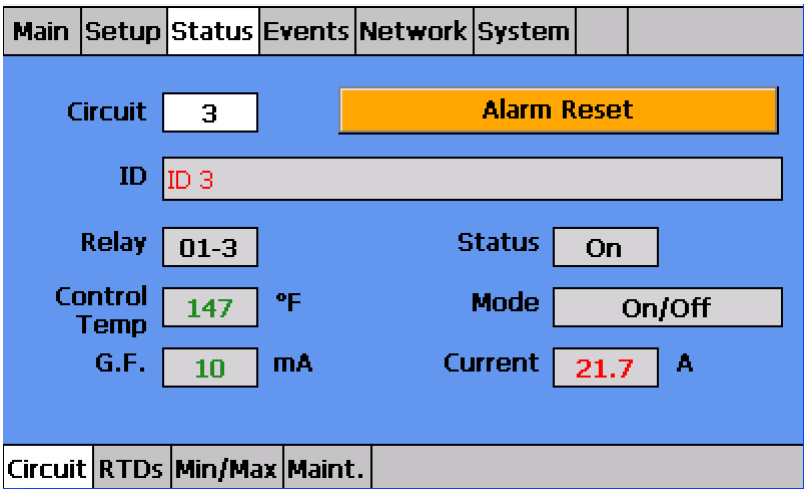


Automatically brings you to the Events|Alarm screen detailing the current alarm.

High Current is a latching alarm, (notice it is blinking red/orange) and requires user action to reset.

Press on

Automatically brings you to Status|Circuit screen for Circuit 3



Notice the Alarm Reset button is blinking red/orange.

Circuit will not reset until high current alarm does not exist.

Press on

to reset alarm.

Go to the Main screen and turn Circuit 3 Line current dial counter clockwise until current is between 3 – 10 A.

6.2.5 GROUND-FAULT ALARM

Turn Circuit 3 Ground-Fault dial, on the front panel of the demo unit, clockwise until G.F. on Main screen reads between 21 and 29.

Main | Setup | Status | Events | Network | System | | Acknowledge

Status - [14:37 10-Apr-09]

Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	73	80	5	0.0	0	On
2	ID 2	73	---	---	0.0	0	Off
3	ID 3	147	145	4	8.1	22	On
4	ID 4	116	120	2	0.0	10	On
5	Voltage	-----	---	---	---	---	Off

Notice ID and G.F. in **Red.**

Press Acknowledge button

Main | Setup | Status | Events | Network | System

Alarms/Events

No.	Time	Ckt#	Alarms - All Active
37	18:28 06-Apr-09	-----	Device 16 Comm Alarm
248	14:37 10-Apr-09	3	Ground Fault Alarm [21mA]

Automatically brings you to the Events|Alarm screen detailing the recent alarm.

Ground-Fault Alarm is a latching alarm, (notice it is blinking red/orange).

Return to the Main screen and turn Circuit 3 Ground-Fault dial clockwise until G.F. is

Main | Setup | Status | Events | Network | System | | Acknowledge

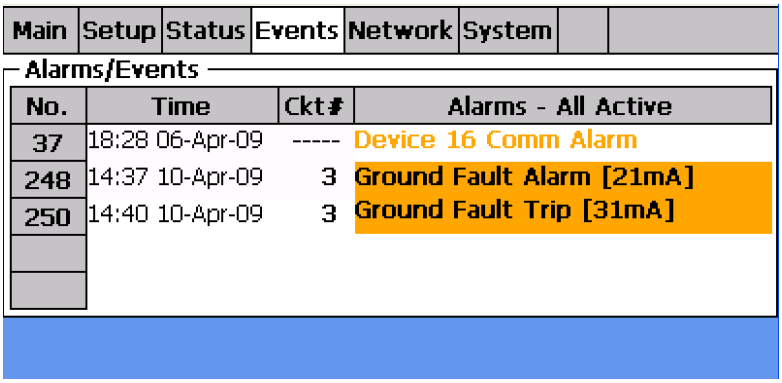
Status - [14:40 10-Apr-09]

Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	73	80	5	0.0	0	On
2	ID 2	73	---	---	0.0	0	Off
3	ID 3	147	145	4	8.1	31	Trip
4	ID 4	116	120	2	0.0	0	On
5	Voltage	-----	---	---	---	---	Off

greater than 30 mA.

Notice, Heater turned off, Relay status Trip

Press Acknowledge button

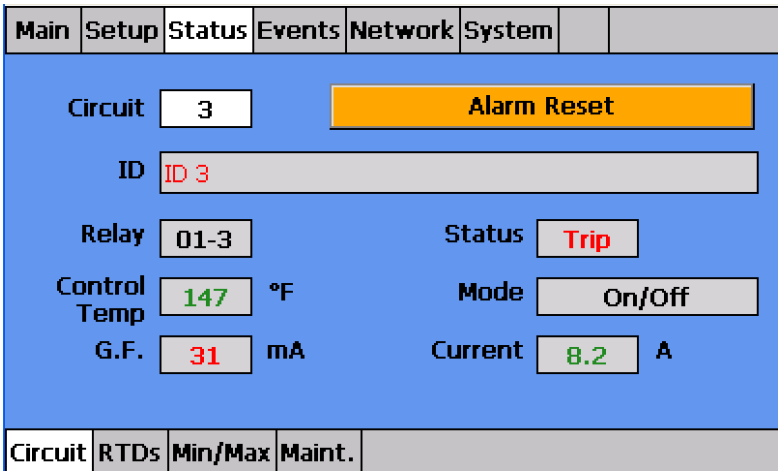


Automatically brings you to the Events|Alarm screen detailing the Ground-Fault Trip alarm.

The high Ground-Fault Trip is a latching alarm, (notice it is blinking red/orange) and requires user action to reset.

Press on **Ground Fault Trip [31mA]**

Automatically brings you to Status|Circuit screen for Circuit 3



Notice the Alarm Reset button is blinking red/orange.

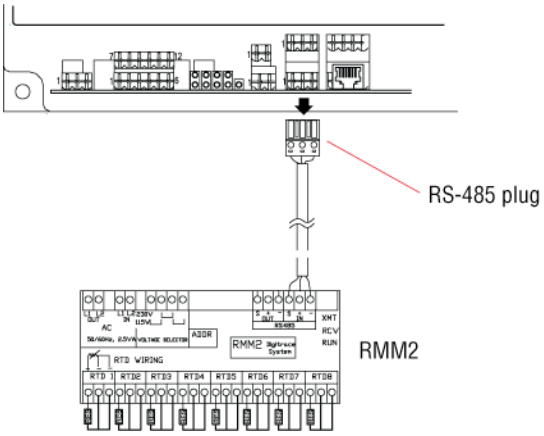
Circuit will not reset until Ground-Fault alarm does not exist.

Turn Circuit 3 Ground-Fault dial counter clockwise until it stops.

Press on **Alarm Reset** to reset alarm.

6.2.6 COMMUNICATION ALARM

Remove the RS-485 plug (RMM2) from the NGC-30-CRMS board.



Go to Main screen

Main | Setup | Status | Events | Network | System | | Acknowledge

Status - [16:45 10-Apr-09]

Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	74	87	2	0.0	0	On
2	ID 2	-----	322	5	0.0	0	Off
4	ID 4	-----	---	---	---	---	---
5	Voltage	-----	---	---	---	---	Off

Notice, ID for Circuit 2 is in Red after a 15-second timeout.

Circuit 2 was using an RTD input from the unplug RMM2 .
(Your demo may be using a different Circuit #.)

Press Acknowledge button

Main | Setup | Status | Events | Network | System | |

Alarms/Events

No.	Time	Ckt#	Events, Press for Alarms
294	16:12 10-Apr-09	2	Fail Safe Alarm
295	16:12 10-Apr-09	-----	RMM2 32 Comm OK
296	16:12 10-Apr-09	2	Fail Safe OK
297	16:12 10-Apr-09	-----	Alarm Acknowledged
298	16:18 10-Apr-09	-----	RMM2 32 Comm Alarm

Automatically brings you to the Events|Alarm screen detailing the RMM2 communication alarm and RMM2 device number.

Reinstall the RS-485 plug back into the NGC-30-CRMS board and communication alarm will clear.

6.3 Proportional Control Demonstration

The proportional control algorithm monitors the control temperature of the Circuit and compares it to the setpoint temperature. If the control temperature is at or below the setpoint temperature, then power is applied to the heater with a duty cycle of 100%. If the control temperature is equal to or greater than the control setpoint temperature + 4°F, then the relay output will have a duty cycle of 0%. The control temperature is constantly monitored, and the output duty cycle is adjusted proportionally once per second.

6.3.1 CIRCUIT 1- USING THE LED LIGHT

Go to Setup|Circuit and confirm that the control mode for Circuit 1 is proportional.

Main | Setup | Status | Events | Network | System

Status - [15:10 10-Apr-09]

Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	78	87	2	0.0	0	On
2	ID 2	78	---	---	0.0	0	Off
3	ID 3	147	---	---	---	---	---
4	ID 4	116	120	2	0.0	0	On
5	Voltage	-----	---	---	---	---	Off

Below 87°F, LED is 100% on.

Hold the RTD in your hand. At 87°F, the proportional control algorithm begins.

Main | Setup | Status | Events | Network | System

Status - [15:12 10-Apr-09]

Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	87	87	2	0.0	0	On
2	ID 2	87	---	---	0.0	0	Off
3	ID 3	147	---	---	---	---	---
4	ID 4	116	120	2	0.0	0	On
5	Voltage	-----	---	---	---	---	Off

At 91°F, the LED light flashes, and at 94°F LED is off.

Main | Setup | Status | Events | Network | System

Status - [15:17 10-Apr-09]

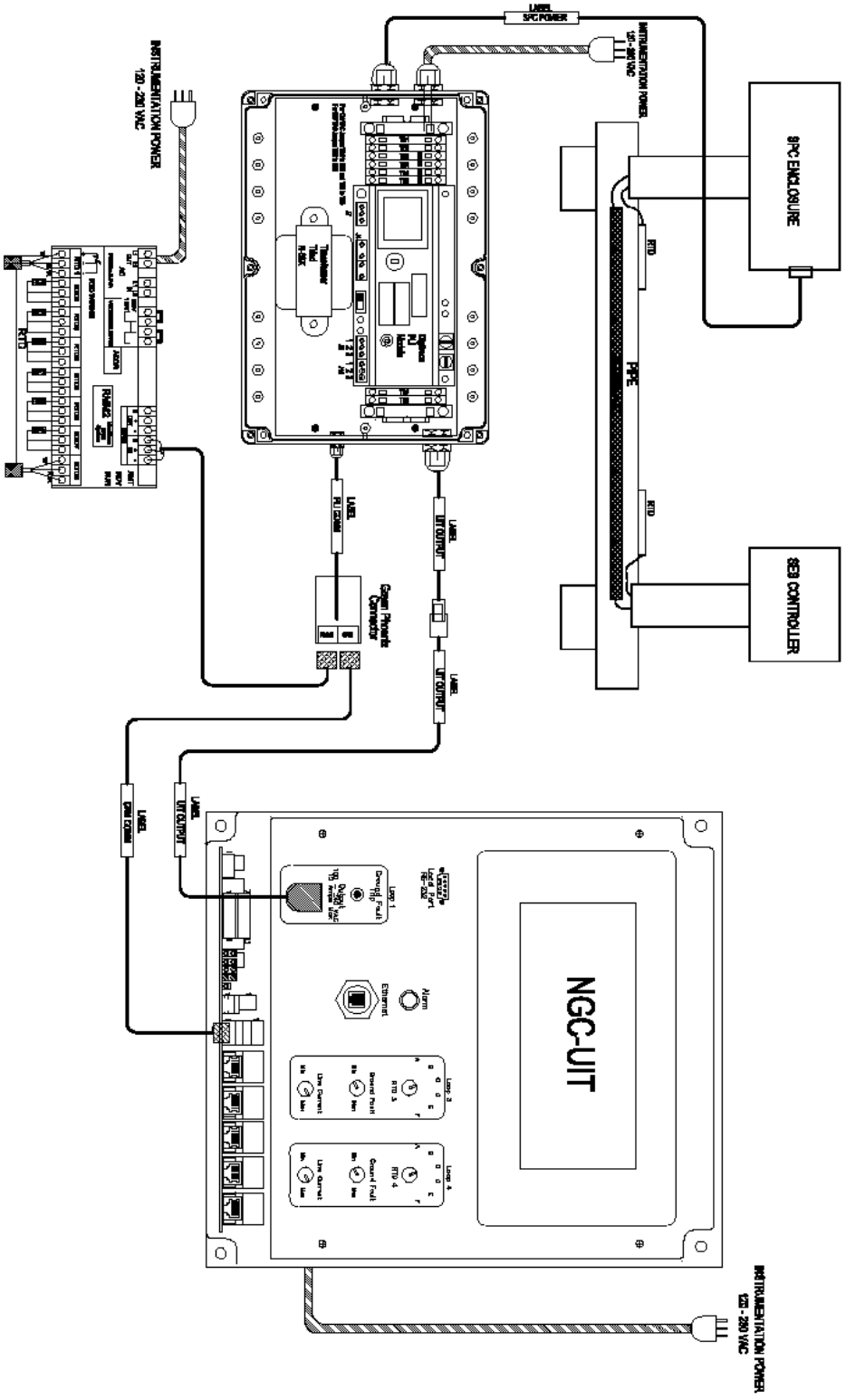
Ckt#	ID	°F	SetPt	DB	Amps	G.F.	Status
1	ID 1	91	87	2	0.0	0	Off
2	ID 2	91	---	---	0.0	0	Off
3	ID 3	147	---	---	---	---	---
4	ID 4	116	120	2	0.0	0	On
5	Voltage	-----	---	---	---	---	Off

Appendix A. PLI Module Demo Unit

The PLI module Demo Unit requires the NGC-30 Demo Unit and consists of the following parts:

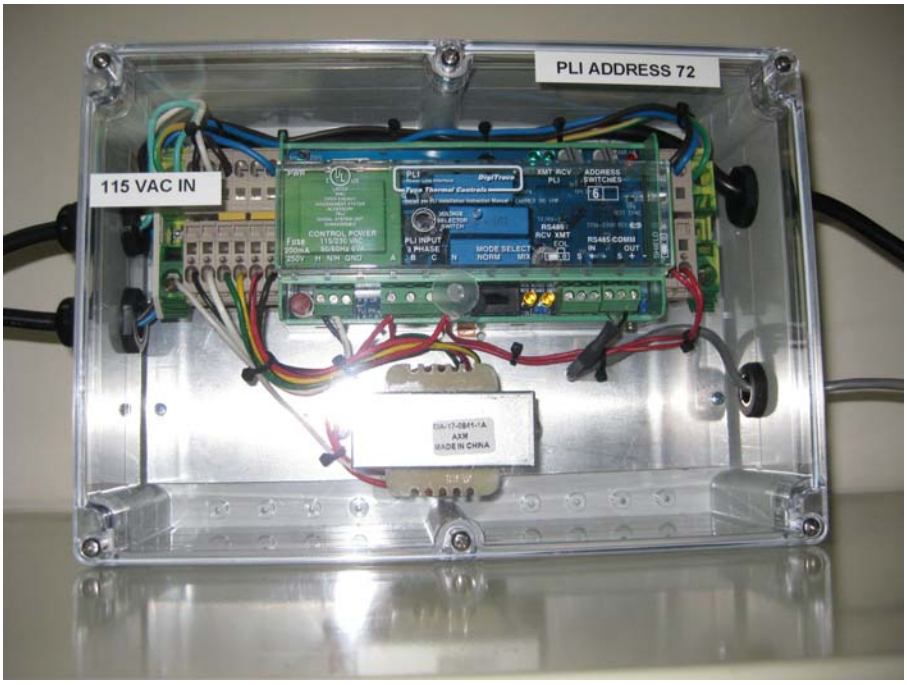
- PLI module box
- Pipe sculpture

PLI Module Demo Unit - Connection Diagram



PLI Module Box

The PLI Module Demo Unit includes a PLI module box. The PLI module box consists of the Power Line Carrier Interface (PLI) module, power transformer and a terminal block.



TRANSFORMER

The PLI Module Box of the Demo Unit includes a transformer. This transformer simulates the power transformer in the plant. The PLI Module instrumentation power must be separate from the heating cable power by using this Isolation transformer that provides phase power to the heat-tracing cable on the pipe sculpture. The primary side receives power from the UIT Demo Unit Output (100 -240 VAC). Regardless of the primary voltage level, the secondary side provides 110 VAC to the heating cable, SES and SPC units.

POWER LINE CARRIER INTERFACE MODULE (PLI)

A Power Line Carrier Interface (PLI) Module is included in the PLI module box. PLI modules provide temperature-monitoring capability for heat-tracing control and monitoring systems by communicating the temperature data to the control system over the heat-tracing bus wires and the AC power line, eliminating the need for RTD wiring. The PLI module receives input from special transmitters, SES, SPC and 700TT, connected to the heat-tracing cable. The transmitters provide pipe temperatures from RTDs and continuity confirmation; they are typically located at the front and/or end of the heat-tracing circuit. Per PLI module, the NGC-30 system can accept up to 127 temperature inputs from SES/SPC transmitters or 255 temperature inputs from 700-TT transmitters. Up to four PLI modules can be connected to one NGC-30 UIT.

The RS-485 address for the PLI module is pre-set. It can be modified using the rotary switch provided on each PLI module. The PLI module switch can be set from 1 to 99. Please refer to the PLI module Installation Instructions, H56850. Each Device in the RS-485 network must have a unique address. If two PLI modules, CRM, or RMM2 are assigned the same address, communication faults will result.

PLI MODULE DEMO VOLTAGE ADJUSTMENT

The PLI module must be plugged into a power outlet. The voltage to the PLI module can be adjusted to 110VAC (100 - 120VAC) or 220VAC (208–240 VAC). The PLI module instrumentation voltage adjustments should be done in two places:

1) On the PLI module

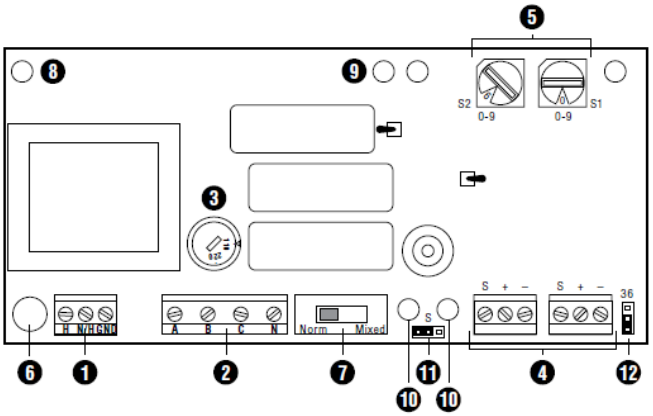
2) On the terminal block in the PLI module box

Voltage Adjustment - on the PLI Module

A Voltage Selection Switch, as indicated in Item # 3 in picture below, must be rotated to the required voltage, 110VAC or 220VAC.

DigiTrace Power Line Carrier Interface Module (PLI)

1. Control power 115/220 Vac 6VA
2. 3 phase power line input from isolation transformer
3. Voltage selector switch
4. RS-485 terminals
5. Address switches
6. Fuse
7. Mixed mode switch
8. Power LED
9. PLI RCV/TX LED's
10. RS-485 RCV/TX LED's
11. EOL (end of line)
12. SHD (shield)

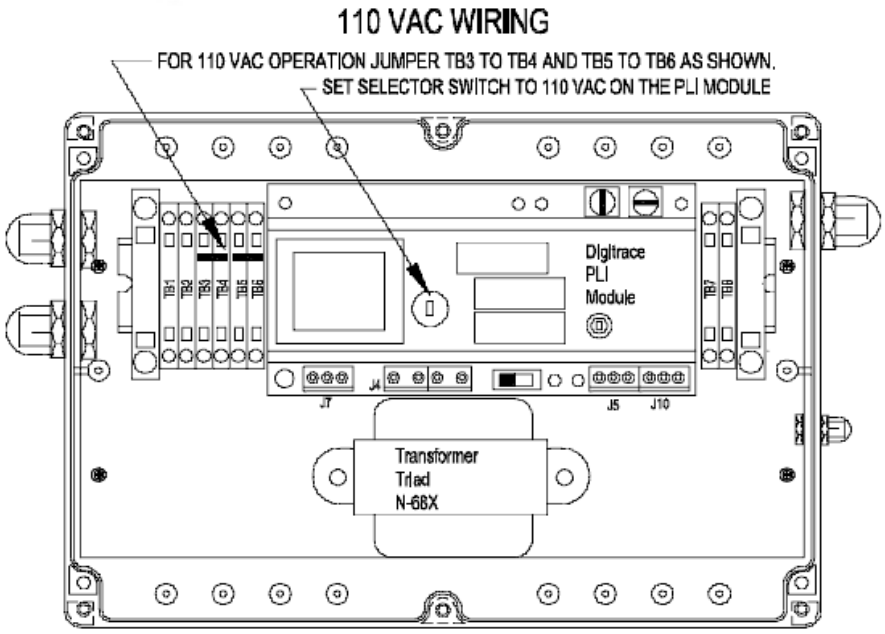


Voltage Adjustment - In the Terminal Block

In the PLI Module Demo Unit, the jumpers on the terminal block need to be changed.

110 VAC

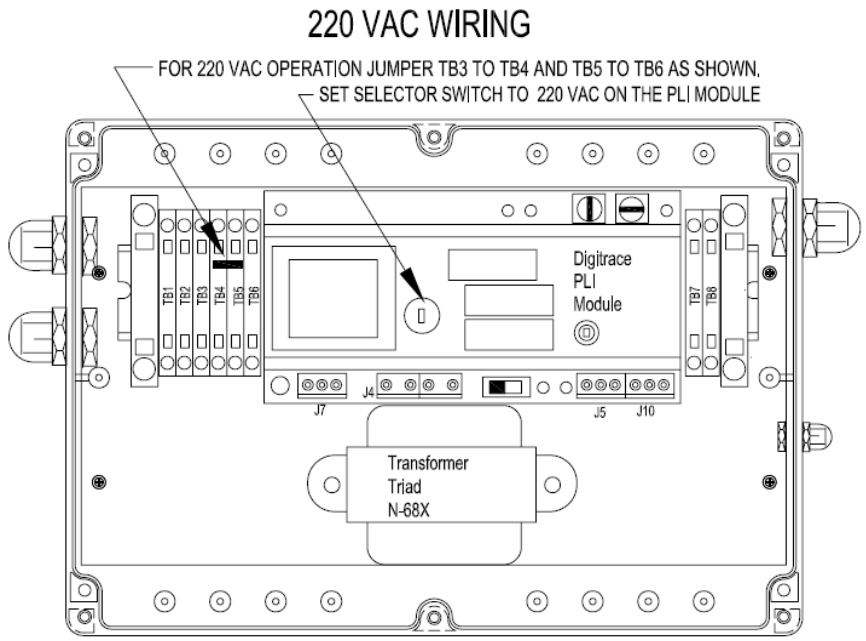
For 110 VAC wiring, jumper TB3/TB4 and jumper TB5/TB6 are required.



110 VAC Wiring

220 VAC

For 220 VAC wiring, jumper TB4/TB5 is required.



220 VAC Wiring

Pipe Sculpture

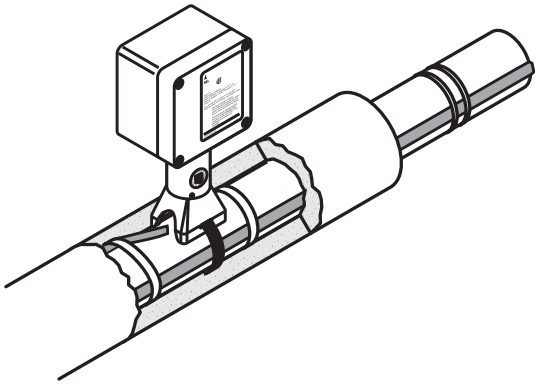
The pipe sculpture consists of the following parts:

- SPC module
- SES module
- Pipe and pipe stands
- Heating cable

PLI Module Demo Unit – pipe sculpture with SES and SPC modules, with covers

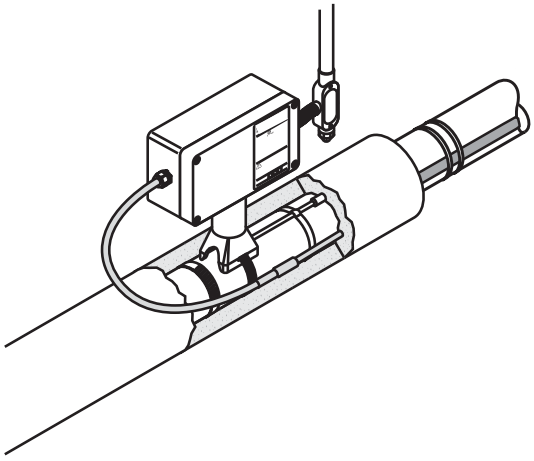
PLI Module Demo Unit – Pipe sculpture with SES and SPC Modules, covers removed

SES TRANSMITTER



A smart end seal transmitter with an RTD (SES-RTD) for temperature and continuity sensing is included on the pipe sculpture of the PLI Module Demo Unit. The SES-RTD transmitter (typically placed at the end of a heater circuit) replaces the end seal and conventional RTD sensing elements and associated wiring, sending temperature and continuity information to the central microprocessor-based controller. The SES transmitter requires a NGC-30 UIT and a power line carrier interface module (PLI module). On/Off control of the heating cable via contactors in the NGC-30 is optional if monitoring only is desired. Up to 127 strategically placed SES transmitters communicate with one PLI module (one PLI module per heat-tracing transformer).

SPC TRANSMITTER



A Smart Power Connector (SPC) is included on the pipe sculpture of the PLI Module Demo Unit. The SPC transmitter serves as power connection kit and temperature sensing device. The SPC transmitter provides power to the heating cable and replaces the power junction box and conventional RTD sensing elements and associated wiring, sending temperature information to the central microprocessor-based controller. The SPC transmitter requires a NGC-30 UIT and a power line carrier interface module (PLI module). On/Off control of the heating cable via contactors in the NGC-30 is optional if monitoring only is desired. Up to 127 strategically placed SPC transmitters communicate with one PLI module (one PLI module per heat-tracing transformer). Since the SPC transmitter was installed at the beginning of the self regulating heating cable, it can be used for temperature monitoring only. The SPC transmitter cannot be used for continuity monitoring. The SPC transmitter is available on pipe or wall-mount options.

PENTAIR

WWW.PENTAIRTHERMAL.COM

NORTH AMERICA
Tel: +1.800.545.6258
Fax: +1.800.527.5703
Tel: +1.650.216.1526
Fax: +1.650.474.7711
thermal.info@pentair.com

EUROPE, MIDDLE EAST, AFRICA
Tel: +32.16.213.511
Fax: +32.16.213.603
thermal.info@pentair.com

ASIA PACIFIC
Tel: +86.21.2412.1688
Fax: +86.21.5426.2937
cn.thermal.info@pentair.com

LATIN AMERICA
Tel: +1.713.868.4800
Fax: +1.713.868.2333
thermal.info@pentair.com

Pentair is owned by Pentair or its global affiliates. All other trademarks are the property of their respective owners. Pentair reserves the right to change specifications without prior notice.

© 2006–2015 Pentair.